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EXAMINER

LYONS, MICHAEL A

ART UNIT PAPER NUMBER

2877

DATE MAILED: 12/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary****Application No.**

10/051,391

**Applicant(s)**

PEZESHKI, BARDIA

**Examiner**

Michael A. Lyons

**Art Unit**

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-42 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

Claims 33 and 35 are objected to because of the following informalities: in line 8, the word “reflected” should read “reflecting”. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-12 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatfield (4,768,182) in view of Holm-Kennedy et al (5,784,507).**

Regarding claim 1, Hatfield (Fig. 5) discloses a moveable path changing optical element 40 in the form of a polygonal mirror which rotates around axis 41 to provide multiple light beams dependent on the position of the mirror, and an optical element 42, explicitly in the form of a carrier disc, but more generally in the form of an etalon (see abstract). The mirror, through its rotation, reflects the initial light beam onto multiple sections of the entire etalon; however, the etalon is not position dependent (although the carrier disc will have data written on it wherever light strikes it).

Holm-Kennedy (Fig. 18A) discloses a spectrometer comprising an etalon having materials of different refractive indices over its length that select various wavelengths dependent on the refractive index of the etalon at the point where the light strikes the etalon. It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute

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the etalon of Hatfield with the etalon of Holm-Kennedy to facilitate the changing and selection of spectral characteristics of an incoming light beam based on where it impinges the etalon, as the light, upon striking the rotating mirror, would impinge upon different parts of the etalon with different refractive indices as mentioned above.

As for claim 2, element 40 of Hatfield is a mirror.

As for claim 3, Hatfield's mirror rotates about axis 41.

As for claim 4, the rotating mirror of Hatfield and a rotating MEMS mirror are functional equivalents; substituting one for the other would result in no operational difference in the device.

As for claim 5, various embodiments of Holm-Kennedy, such as Fig. 17A, are Fabry-Perot filters.

As for claim 6, Fig. 17A discloses a wedge shaped Fabry-Perot.

As for claim 7, Fig. 17A is a wedge shaped Fabry-Perot etalon.

As for claim 8, the filter contains steps of varying cavity length.

As for claim 9, Hatfield discloses photodetector 24.

As for claim 10, Hatfield discloses lens 17.

As for claim 11, a controller to command adjustments to the rotation of the mirror is inherent to the device.

As for claim 12, Fabry-Perot cavities are interferometers.

As for claim 15, it would have been obvious to substitute a device with different reflectivities due to different polarizations for the etalon of Holm-Kennedy, as this would not change the overall function of the device.

As for claim 16, Official Notice is taken as to the known use of optical fibers for light provision or transportation in an interferometric system; moving light from one element in a system to another through a fiber rather than through air would create no functional difference in the operation of the device.

As for claim 17, an optical circulator and beamsplitter 16 of Hatfield are functional equivalents.

As for claim 18, the etalon of Fig. 17A of Holm-Kennedy can be comprised of "graded thickness waveguides" (Col. 32, line 33).

**Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatfield (4,768,182) in view of Holm-Kennedy (5,784,507).**

Regarding claim 13, Hatfield (Fig. 5) discloses a moveable path changing optical element 40 in the form of a polygonal mirror which rotates around axis 41 to provide multiple light beams dependent on the position of the mirror, and an optical element 42, explicitly in the form of a carrier disc, but more generally in the form of an etalon (see abstract). The mirror, through its rotation, reflects the initial light beam onto multiple sections of the entire etalon; however, the etalon is not position dependent (although the carrier disc will have data written on it wherever light strikes it).

Holm-Kennedy (Fig. 18A) discloses a spectrometer comprising an etalon having materials of different refractive indices over its length that select various wavelengths dependent on the refractive index of the etalon at the point where the light strikes the etalon. It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the etalon of Hatfield with the etalon of Holm-Kennedy to facilitate the changing and selection

of spectral characteristics of an incoming light beam based on where it impinges the etalon, as the light, upon striking the rotating mirror, would impinge upon different parts of the etalon with different refractive indices as mentioned above.

Further, Official Notice is taken as to the known use of optical fibers for light provision or transportation in an interferometric system; moving light from one element in a system to another through a fiber rather than through air would create no functional difference in the operation of the device. Finally, Fabry-Perot cavities, such as the etalon of Holm-Kennedy, are interferometers.

As for claim 14, an optical circulator and beamsplitter 16 of Hatfield are functional equivalents.

**Claims 19-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatfield (4,768,182) in view of Holm-Kennedy et al (5,784,507).**

Regarding claims 19 and 29, Hatfield (Fig. 5) discloses a moveable path changing optical element 40 in the form of a polygonal mirror which rotates around axis 41 to provide multiple light beams dependent on the position of the mirror as means for providing light (claim 19) and means for reflecting light (claim 29), and an optical element 42, explicitly in the form of a carrier disc, but more generally in the form of an etalon (see abstract) as a spatially varying optical unit (claim 19) and as means for receiving light (claim 29). The mirror, through its rotation, reflects the initial light beam onto multiple sections of the entire etalon; however, the etalon is not position dependent (although the carrier disc will have data written on it wherever light strikes it).

Holm-Kennedy (Fig. 18A) discloses a spectrometer comprising an etalon having materials of different refractive indices over its length that select various wavelengths dependent on the refractive index of the etalon at the point where the light strikes the etalon. It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the etalon of Hatfield with the etalon of Holm-Kennedy to facilitate the changing and selection of spectral characteristics of an incoming light beam based on where it impinges the etalon, as the light, upon striking the rotating mirror, would impinge upon different parts of the etalon with different refractive indices as mentioned above.

Regarding claim 30, the rejections of claims 1, 19, and 29 above disclose that the combined device of Hatfield and Holm-Kennedy teach the claimed elements of the invention. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the claimed method of using the claimed invention to the combined device of Hatfield and Holm-Kennedy to facilitate the generation of the desired results of the claimed invention.

As for claims 20, 22, and 25-26, it would have been obvious to substitute a device with different reflectivities due to different polarizations for the etalon of Holm-Kennedy, as this would not change the overall function of the device.

As for claim 21, the filter contains steps of varying cavity length.

As for claim 23, the changes of refractive indexes in the etalon filters the light based on wavelength.

As for claim 24, Fig. 17A is a Fabry-Perot filter of varying cavity length.

As for claims 27 and 28, the etalon of Fig. 17A of Holm-Kennedy can be comprised of “graded thickness waveguides” (Col. 32, line 33).

As for claims 31 and 32, Official Notice is taken as to the known use of optical fibers for light provision or transportation in an interferometric system; moving light from one element in a system to another through a fiber rather than through air would create no functional difference in the operation of the device.

**Claims 33-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatfield (4,768,182) in view of Holm-Kennedy (5,784,507).**

Regarding claims 33 and 35, Hatfield (Fig. 5) discloses a moveable path changing optical element 40 in the form of a polygonal mirror which rotates around axis 41 to provide multiple light beams dependent on the position of the mirror, and an optical element 42, explicitly in the form of a carrier disc, but more generally in the form of an etalon (see abstract). The mirror, through its rotation, reflects the initial light beam onto multiple sections of the entire etalon; however, the etalon is not position dependent (although the carrier disc will have data written on it wherever light strikes it). In addition, optical fibers and an optical circulator are not disclosed; the light simply travels through the system, and light is split and directed using beamsplitter 16.

Holm-Kennedy (Fig. 18A) discloses a spectrometer comprising an etalon having materials of different refractive indices over its length that select various wavelengths dependent on the refractive index of the etalon at the point where the light strikes the etalon.

Further, Official Notice is taken as to the known use of optical fibers for light provision or transportation in an interferometric system; moving light from one element in a system to another through a fiber rather than through air would create no functional difference in the



operation of the device. Also, an optical circulator and beamsplitter 16 of Hatfield are functional equivalents, as the light is split or directed from one path to another by each device.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the etalon of Hatfield with the etalon of Holm-Kennedy to facilitate the changing and selection of spectral characteristics of an incoming light beam based on where it impinges the etalon, as the light, upon striking the rotating mirror, would impinge upon different parts of the etalon with different refractive indices as mentioned above. It also would have been obvious to one of ordinary skill in the art at the time the invention was made to add the optical fibers and substitute the beamsplitter for an optical circulator in the device of Hatfield for the functional equivalency reasons disclosed above.

Regarding claims 39 and 41, Hatfield (Fig. 5) discloses a moveable path changing optical element 40 in the form of a polygonal mirror which rotates around axis 41 to provide multiple light beams dependent on the position of the mirror, and an optical element 42, explicitly in the form of a carrier disc, but more generally in the form of an etalon (see abstract). The mirror, through its rotation, reflects the initial light beam onto multiple sections of the entire etalon; however, the etalon is not position dependent (although the carrier disc will have data written on it wherever light strikes it). In addition, optical fibers and an optical circulator are not disclosed; the light simply travels through the system, and light is split and directed using beamsplitter 16.

Holm-Kennedy (Fig. 18A) discloses a spectrometer comprising an etalon having materials of different refractive indices over its length that select various wavelengths dependent on the refractive index of the etalon at the point where the light strikes the etalon. This etalon

(such as the one disclosed in Fig. 17A) of Holm-Kennedy can be comprised of “graded thickness waveguides” (Col. 32, line 33).

Further, Official Notice is taken as to the known use of optical fibers for light provision or transportation in an interferometric system; moving light from one element in a system to another through a fiber rather than through air would create no functional difference in the operation of the device. Also, an optical circulator and beamsplitter 16 of Hatfield are functional equivalents, as the light is split or directed from one path to another by each device.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the etalon of Hatfield with the etalon of Holm-Kennedy to facilitate the changing and selection of spectral characteristics of an incoming light beam based on where it impinges the etalon, as the light, upon striking the rotating mirror, would impinge upon different parts of the etalon with different refractive indices as mentioned above. It also would have been obvious to one of ordinary skill in the art at the time the invention was made to add the optical fibers and substitute the beamsplitter for an optical circulator in the device of Hatfield for the functional equivalency reasons disclosed above.

As for claims 34, 36, and 42, the dispersion of the light is affected by its reflection throughout parts of the etalon.

As for claim 38, the specific rotation of the mirror and the movement of the optical element are matters of design choice, as such movement only controls polarization as claimed which does not change the overall operation of the device.

As for claim 40, Hatfield discloses detector 24; its positioning is a matter of design choice, as the same signals would be detected either transmitted through the waveguide or reflected by it.

***Response to Arguments***


Applicant's arguments, see the amendment filed September 3, 2003, with respect to the rejection(s) of claim(s) 1-30 under 35 USC 103 over Adamovsky in view of Holm-Kennedy have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the rejections as disclosed above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael A. Lyons whose telephone number is 703-305-1933. The examiner can normally be reached on Monday thru Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G Font can be reached on 703-308-4877. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0935.

MAL  
December 2, 2003

  
**Samuel A. Turner**  
**Primary Examiner**